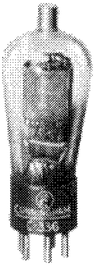
Cunningham RADIO TUBES



C-336

RADIO-FREQUENCY AMPLIFIER

The '36 is a screen grid radio-frequency amplifier and detector for use in automobile receivers or sets operated from d-c power lines. It contains a heater-cathode which is designed for d-c operation. Its design permits uniform tube operation over a comparatively wide range of heater voltages without appreciably affecting either the performance or serviceability of the tube. This feature, together with that of general freedom from microphonic and battery circuit disturbances, makes the '36 well suited to mobile service and other applications where complete d-c operation is desirable.

CHARACTERISTICS

Heater Voltage (D. C.)			6.3	Volts
Heater Current			0.3	Ampere
Plate Voltage	90*	135	180 *max.*	Volts
Screen Voltage	55	67.5	90 *max.*	Volts
Grid Voltage	−1.5	−1.5	−3	Volts
Plate Current	1.8	3	3.1	Milliamperes
Screen Current	Not over 1/3 of plate current			
Plate Resistance	250000	300000	350000	Ohms
Amplification Factor	215	315	370	
Mutual Conductance	850	1050	1050	Micromhos
Effective Grid-Plate Capacitance			0.01 *maximum*	μμf.
Input Capacitance			3.7	μμf.
Output Capacitance			9.2	μμf.
Overall Length				4 9/32″ to 4 17/32″
Maximum Diameter				1 9/16″
Bulb (See page 42, Fig. 9)				S-12
Cap				Small Metal
Base				Small 5-Pin

* Particularly applicable to receivers designed for operation from 110-volt d.c. power line.

INSTALLATION

The **base** pins of the '36 fit the standard five-contact socket which may be mounted to hold the tubes in any position. For socket connections, see page 39, Fig. 9.

The **heater** of the '36 is designed to operate satisfactorily from a 6-volt automobile storage battery without a rheostat or fixed resistor, despite the voltage fluctuations during the charge and discharge periods. These variations in the applied heater voltage do not seriously affect the performance or serviceability of this tube. The heater may be operated in series with the heaters of the '37, '38 or '39. This feature is especially desirable in receivers designed to operate from d-c house mains. Regardless of the number of heaters connected in series, the current in the heater circuit should be adjusted to 0.3 ampere for the normal supply voltage.

The **cathode** circuit in most d-c receivers is usually tied in either directly or through biasing resistors to the negative side of the heater circuit. The voltage difference thus introduced between heater and cathode should be kept as much as possible below the recommended maximum of 45 volts.

The positive **screen voltage** for the '36 may be obtained from a section of the B-battery, or from a fixed or variable tap on a voltage divider connected across the

supply voltage, or a portion of the supply. The impedance between the screen and cathode should be kept as low as possible by means of suitable by-pass condensers.

Complete **shielding** of all stages of the circuit is necessary if maximum gain per stage is to be obtained.

APPLICATION

As a **radio-frequency amplifier,** the '36 should be operated as shown under CHARACTERISTICS. Neither the plate nor the screen voltage is critical. In general, properly designed radio-frequency transformers are preferable to interstage coupling impedances, especially in cases where a high impedance B-supply may cause oscillation below radio frequencies.

As a **detector,** the '36 may be operated either with grid leak and condenser or with grid bias. For grid bias detection, suitable operating conditions are: Plate supply voltage, 135 volts applied through a plate coupling resistor of 250000 ohms; positive screen voltage, 67.5 volts; and negative grid bias, 6 volts (approx.), so adjusted that a plate current of 0.1 milliampere is obtained with no a-c input signal. When grid leak and condenser detection is employed, a plate voltage of 45 volts applied through a plate coupling resistor of 250000 ohms together with a positive screen voltage up to 45 volts will be satisfactory. A grid leak of 2 to 5 megohms and a grid condenser of 0.00025 µf. will be suitable.

AVERAGE PLATE CHARACTERISTICS

